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POTATO ROT NEMATODE
DITYLENCHUS DESTRUCTOR THORNE, 1945

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HISTORY: In 1888, Kühn described symptoms caused by a pest on potatoes (subsequently named Ditylenchus destructor by Thorne in 1945) in Germany. It was first detected in the United States in Idaho in 1943.

REGULATORY STATUS: Potato rot nematode is unknown in Florida. Detection of this pest in Florida plants would necessitate immediate regulatory action. In Holland, tulips or daffodils infected with potato rot nematode must be treated with hot water or destroyed.

GEOGRAPHIC DISTRIBUTION: Potato rot nematode is reported from the following states: Arkansas, California, Hawaii, Idaho, Indiana, New Jersey, Oregon, Wisconsin; and also from Bangladesh, British Columbia, Canary Islands, England, Estonia, Germany, Hungary, Iran, Ireland, Italy, Latvia, Lithuania, Netherlands, Pakistan, Poland, Prince Edward Island, Russia, South Africa, and Sweden.

HOST LIST: The following plants are hosts of this nematode: Agropyron repens (L.) Beauv., Allium cepa L., A. sativum L., Apium graveolens L., Arachis hypogaea L., Artesisia vulgaris L., Barbarea vulgaris R. Br., Begonia sp., Bellis perennis L., Beta vulgaris L., Canna indica L., Cicer arietinum L., Cimicifuga racemosa (L.) Nutt., Cirsium arvense (L.) Scop., Colchicum sp., Cucumis sativus L., Dahlia pinnata Cav., Daucus carota L., Festuca pratensis Huds., Fragaria chiloensis (L.) DuChesne, Fumaria officinalis L., Gladiolus sp., Glycine max (L.) Merrill, Helianthus annuus L., Hordeum vulgare L., Humulus lupulus L., Ipomoea batatas (L.) Lam., Iris sp., Lathyrus hirsutus L., L. latifolius L., Leontodon taraxacum L. (Taraxacum officinale Wiggers), Linaria vulgaris Mill., Lycopersicon esculentum Mill., Medicago sativa L., Melilotus officinalis (L.) Pall., Mentha arvensis L., Pastinaca sativa L., Plantago major L., Potentilla anserina L., Raphanus sativus L., Rheum rhaponticum L., Rumex acetosella L., R. obtusifolius L., Saccharum officinarum L., Sisyrinchium angustifolium Mill., Solanum nigrum L., S. tuberosum L., Solidago graminifolia Salisb., (S. lanceolata L.), Sonchus arvensis L., S. asper (L.) All., Stachys palustris L., Stenotaphrum secundatum (Walt.) O. Kuntze, Tigridia pavonia (L.f.) DC., Tropaeolum ploryphyllum Cav., Trifolium hybridum L., T. pratense L., T. repens L., Tripleurospermum maritimum (L.) W. D. J. Koch, Triticum aestivum (L.), Tulipa praestans Hort. var. 'Tuberg', T. saxatilis Sieber ex K. Spreng., Tussilago farfara L., Vicia sativa L., and Vigna unguiculata (L.) Walp. (V. sinensis L.).

RESISTANCE: The following potato (Solanum tuberosum L.) varieties have shown resistance to the pest: 'Ali', 'Annett', 'Apta', 'Aquila', 'Bintje', 'Drossel', 'Elsa', 'Fekula', 'Khorza', 'Pimpernel', 'Poed', 'Red star', and 'Vanda'.

SYMPTOMS: Infestations rarely occur in aerial plant parts. Aboveground symptoms such as plant stunting and deformed leaves rarely occur. Below ground, minute grey to brown spots appear on infested tubers. Feeding cavities enlarge, coalesce, and become mealy and granular. The tuber skin dries, shrinks, and cracks (fig. 1). Large cavities of internal rot are present in the final stages of infection. Tissue invasion and rotting continue during tuber storage. Many infected tubers mummify in storage.

PATHOGENICITY: After the nematode spear enters the cell, saliva flows into the cell for 3-4 min causing cell disorganization. The pest incites protein breakdown, coagulation, necrosis, and intensified dehydrogenase activity. Starch hydrolysis increases turgor causing cell walls to rupture. Starch is reduced 30-38%, glucose increases, and sucrose decreases. Healthy tubers have more water and less nitrogen. Drought resistance is decreased in the presence of potato rot nematode.

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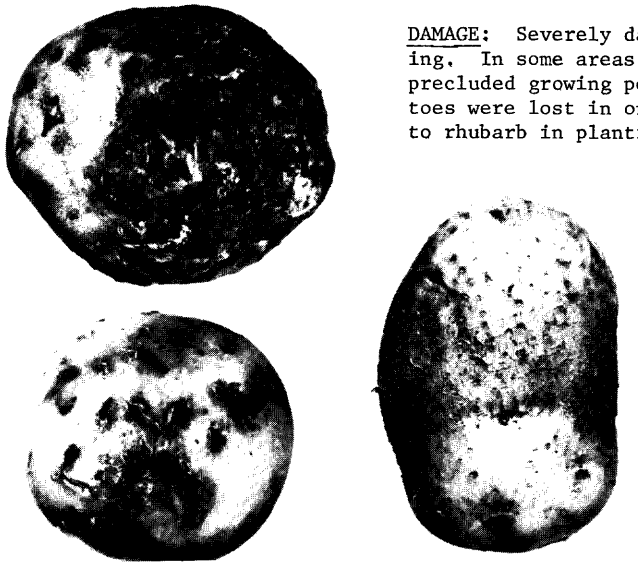

Fig. 1 Left: Potatoes infected with potato rot nematode. Right: Healthy potato.

DAMAGE: Severely damaged potato fields are not worth harvesting. In some areas crop failure due to potato rot nematode precluded growing potatoes. In Russia over 150,000 T of potatoes were lost in one year to this pest. Severe damage occurred to rhubarb in plantings with 1000 nematodes per 250 g soil.

FUNGUS RELATIONSHIPS: Potato rot nematodes feed on over 65 species of fungi. They prefer fungi to potatoes and are found where the mycelium is most dense. They can survive on fungi in the absence of other host plants. The most severe damage occurs where fungi and the nematode occur together in the tuber.

LONGEVITY: The pest persisted 3 yrs in soil grown to nonhost crops. Overwintering usually is in the freeze-resistant egg stage. In the absence of a favored host plant the nematode survives on host crop residues, weed hosts, and soil fungi.

DISSEMINATION: Infected planting stock is the principal means by which this pest enters new areas.

CONTROL

NATURAL: Only uninfected tubers should be used for planting stock. Early harvest reduces infestations. Exposing tubers to the sun for 4-10 days also reduces nematode populations. Ammonium sulphate at 550-600 kg/ha and ammonium nitrate at 400-450 kg/ha increased yields and decreased the nematode population. A 3-yr rotation of bean, corn, and fallow reduced nematode populations.

CHEMICAL: EDB (preplant) 37.5 l/ha, in spring, followed by 18.8 l/ha, in fall, resulted in clean tubers for 2 yrs.

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*A total of 210 references were consulted, all of which are filed in the Nematology Bureau nematode pathogen file.